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November 14, 2023

Dell Power Plant
Dell, AR

The following report is a summary of findings from the vibration survey that was performed on November 8, 2023. The report only contains defects/issues found from the survey.

QualiTest® uses a four step rating system for defects.

Class I: Defect is present, but effect on reliability is not clear; no immediate action is required. Continue to normally monitor.

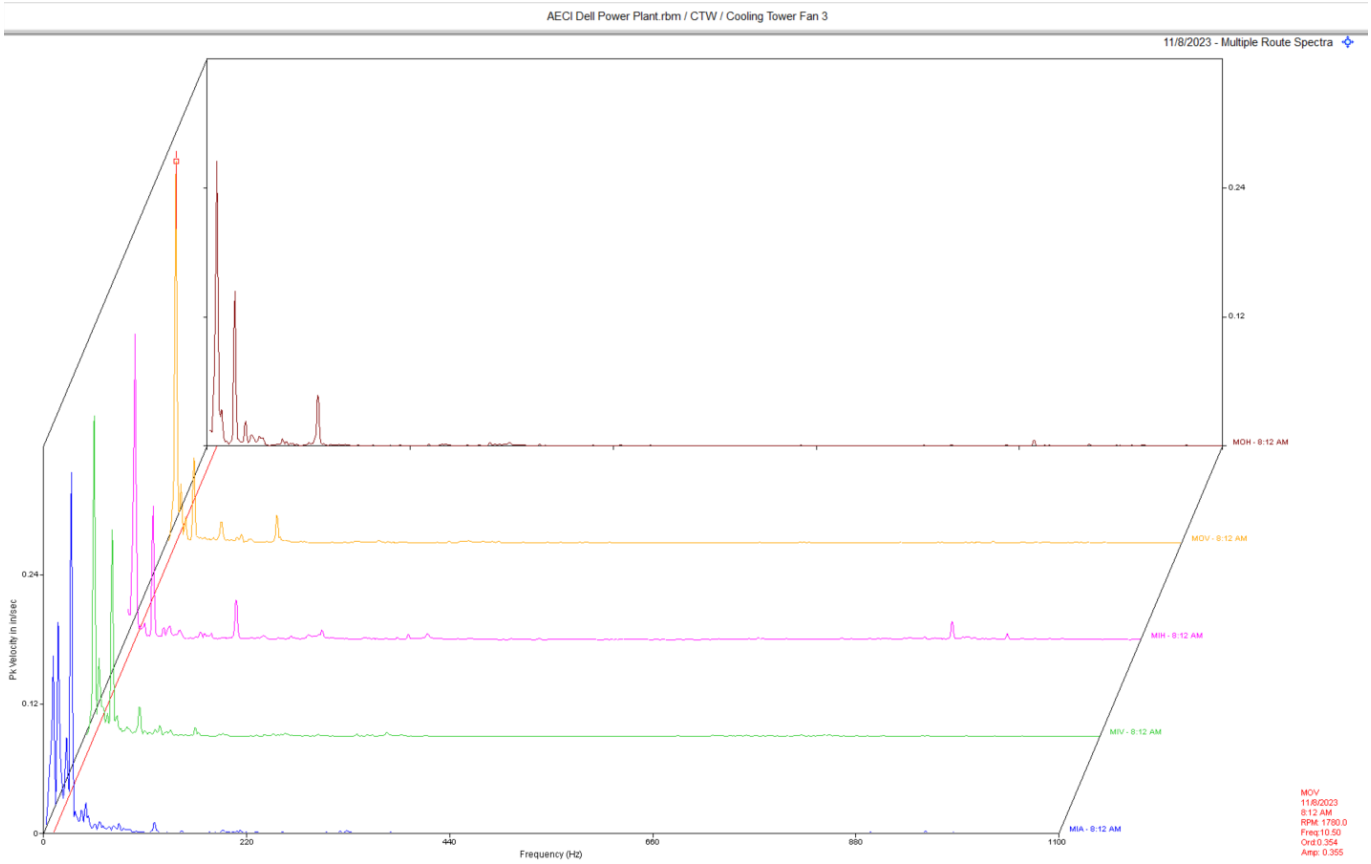
Class II: Defect (s) present that may cause problem in long term (2-6 months). Repair during normal maintenance scheduling. Continue to monitor.

Class III; Defect (s) present that may cause failure in short term (less than 2 months). This should be addressed as soon as practical, with a high maintenance priority. Increase monitoring frequency.

Class IV; Defect (s) present that makes continued reliability unpredictable, and possibility of secondary damage is high. Repairs should be made ASAP. An unscheduled shutdown should be considered for repairs

COOLING TOWER AREA

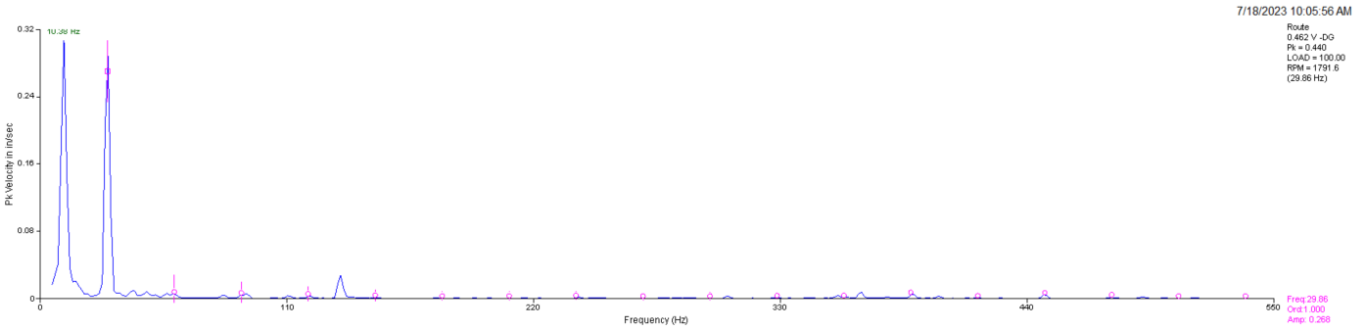
Cooling Tower Fan 3 CLASS II



Observation:
Motor multi-point spectra shows a dominant vibration around 10 Hz. There is also some 1 x motor rpm vibration as well.

Recommendation:
Data shows a sub-synchronous vibration that is related to fan speed. Check gearbox foot bolts and fan hub as time allows. Ensure all are tight.

Cooling Tower Fan 9 CLASS II



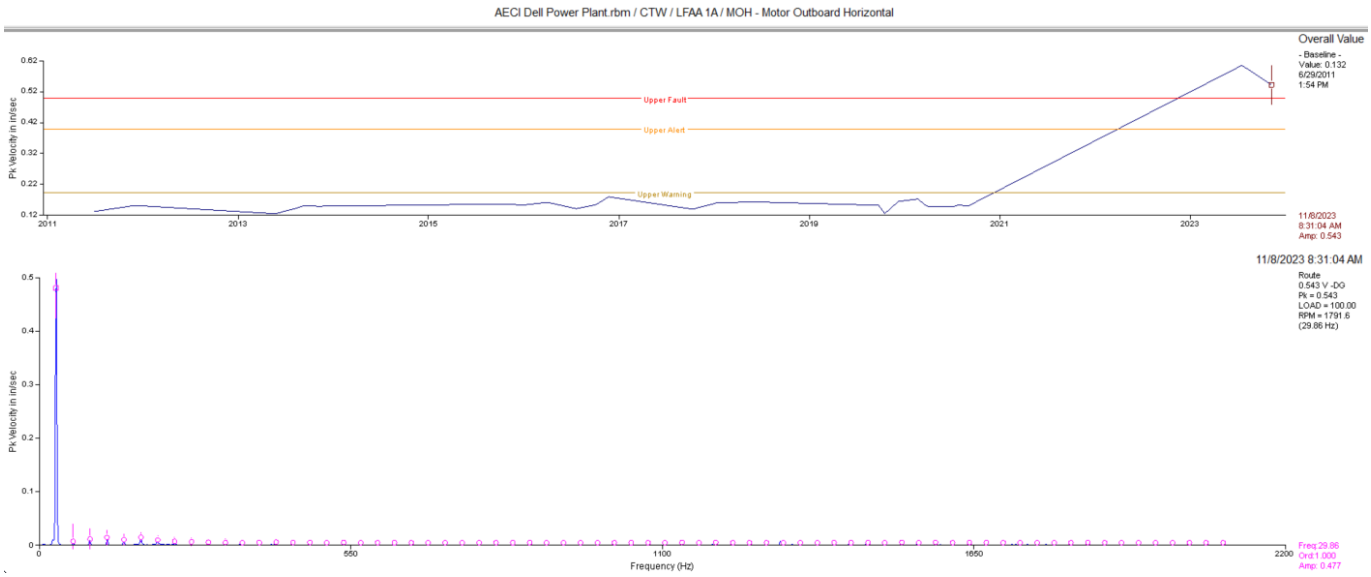
Observation:

Motor outboard horizontal shows a large sub-synchronous peak with a high 1 x motor rpm peak present as well.

Recommendation:

Vibration data suggests checking all motor and gearbox fasteners. Check coupling/spacer shaft also. Inspect structural/base fasteners also.

LFAA 1A CLASS III



Observation:

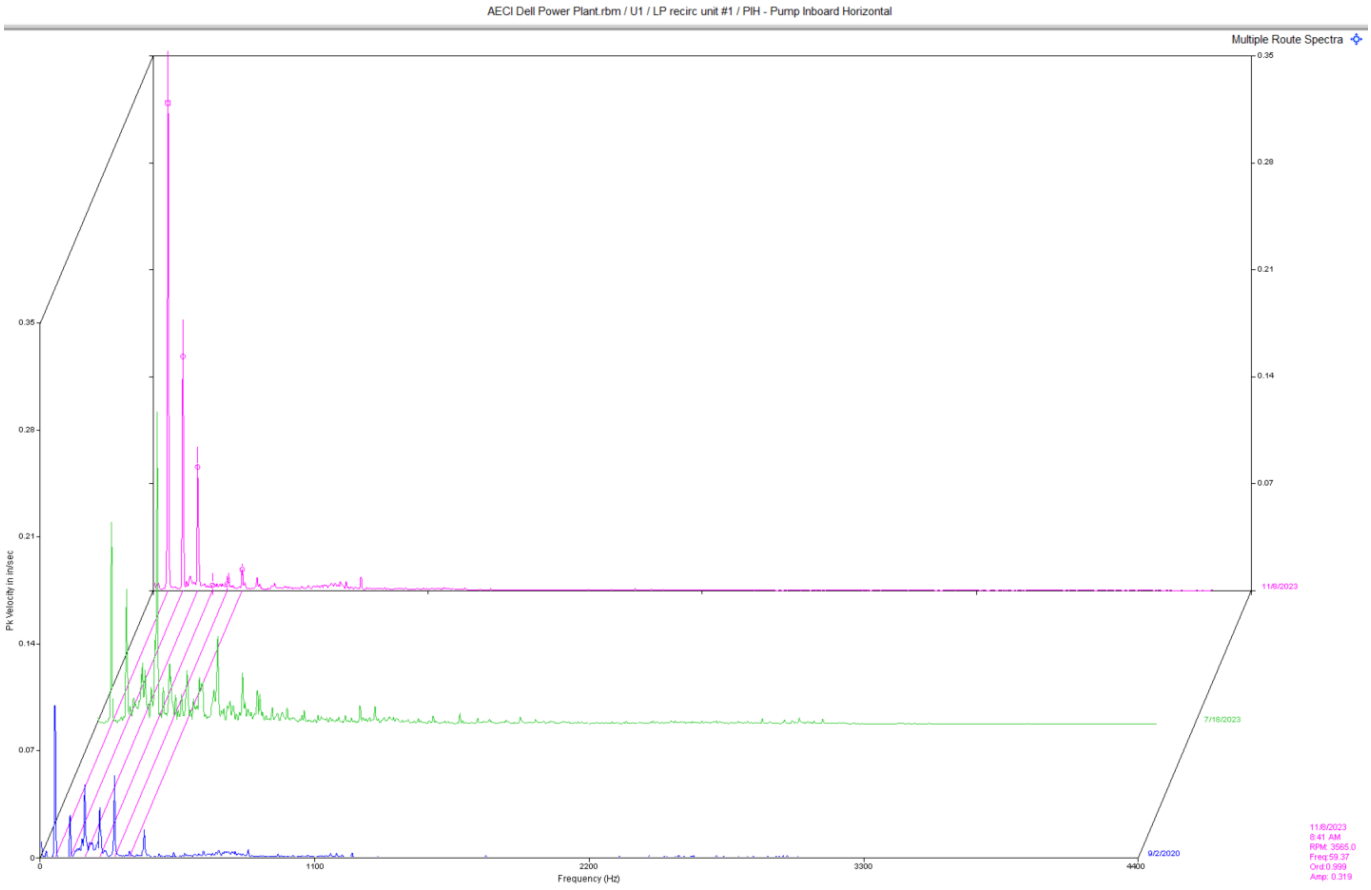
MOH data higher than normal overall amplitude. Dominant 1 x rpm vibration can be seen in the MOH velocity spectrum.

Recommendation:

The increased 1 x rpm vibration is causing concern and may be caused by issue in the pump. Vertical motors typically start to have 1 x rpm vibration when the pump shaft/bushings start to wear. Process flow can also contribute to this type of vibration. Inspect pump and coupling as soon as practical.

GAS TURBINE UNIT 1

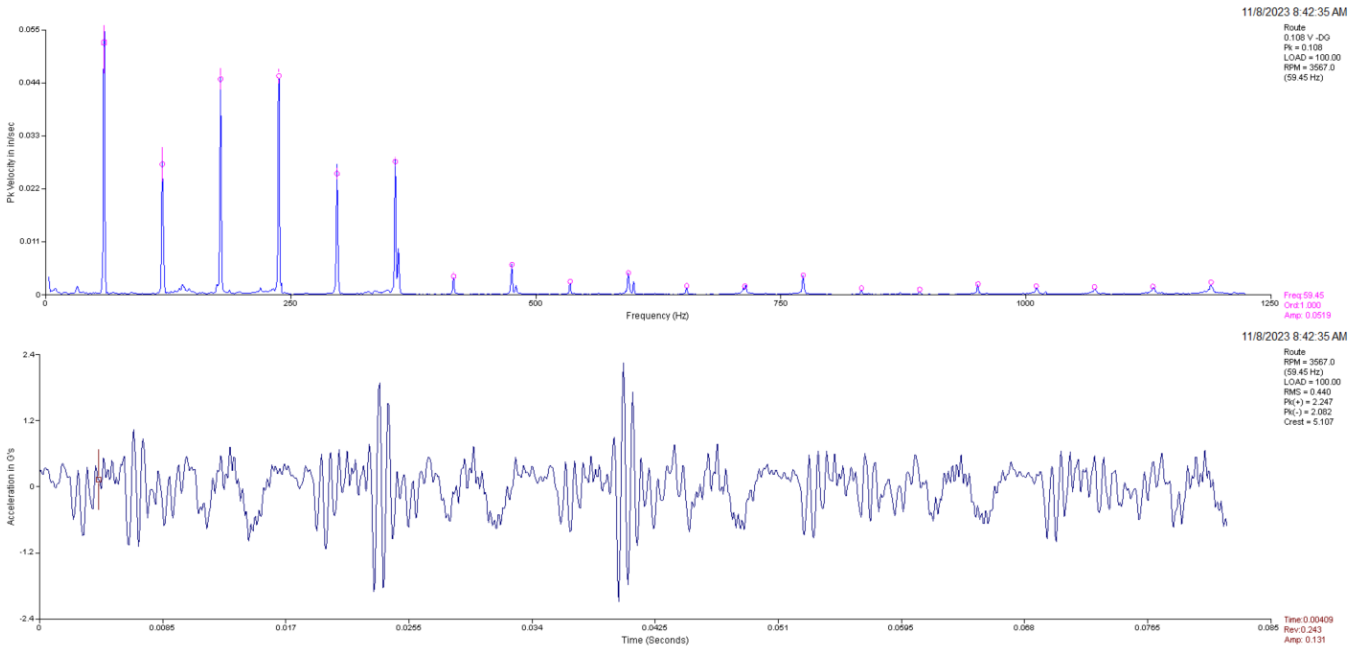
LP Recirc Unit 1 CLASS II



Observation:
Multiple spectra of the pump inboard horizontal show an increase in 1, 2, and 3 x rpm vibration this survey.

Recommendation:
Looks like the motor has been changed out since last survey. The pump now has some increased vibration. Data suggests a coupling issue, or issue with pump. Check pump coupling for wear and check pump shaft for run out as time allows.

Boiler Feed Water Pump 1B CLASS I



Observation:

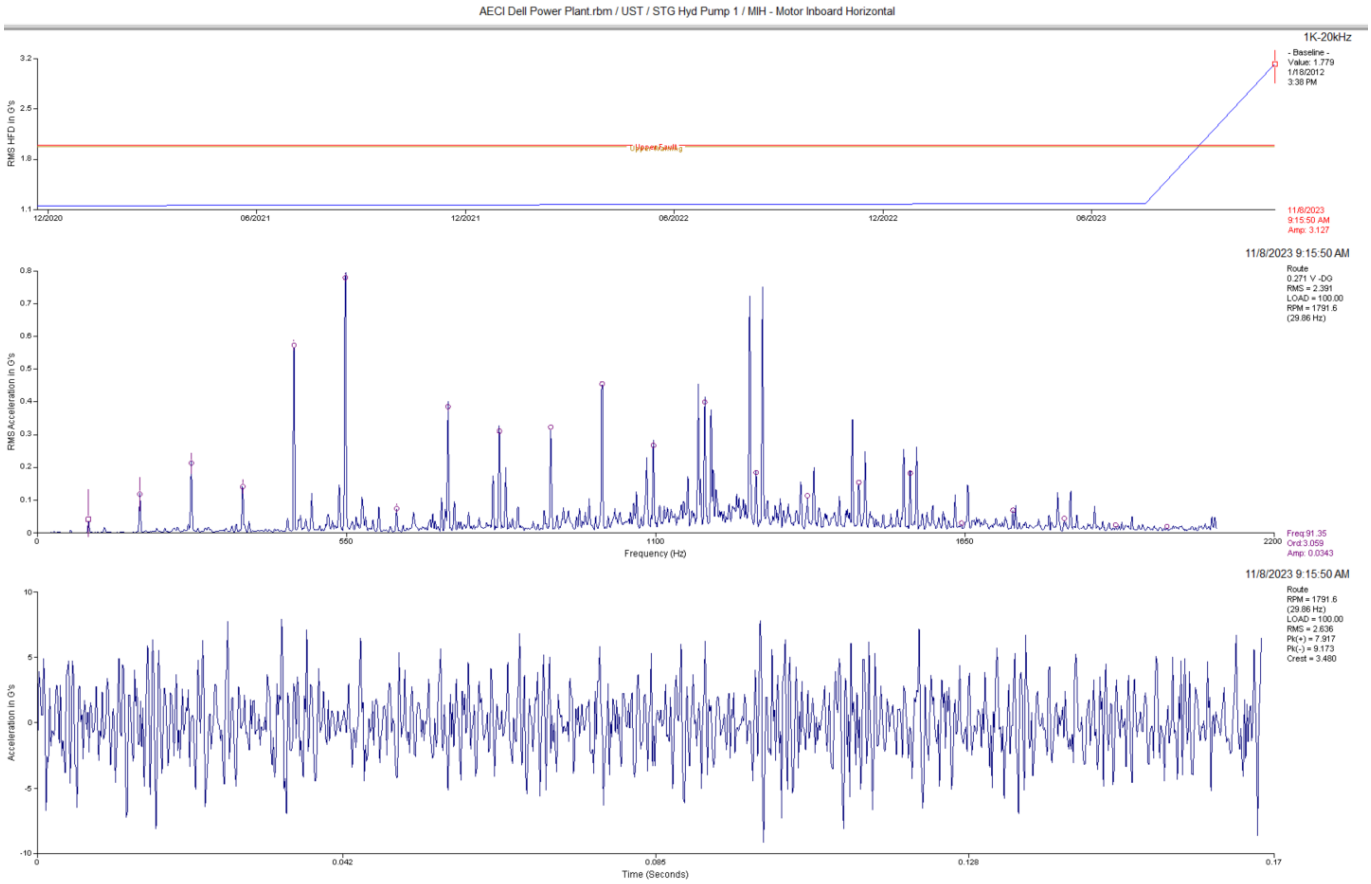
MOH spectra show some rpm harmonics in motor data. Waveform data shows some slight impacting.

Recommendation:

Motor data indicates some possible clearance issues in the motor bearings. This appears to be minor as of now and we will continue to monitor this closely.

STEAM TURBINE UNIT

STG Hydraulic Pump 1 CLASS III



Observation:

Multiple harmonics 3.059 orders can be seen in the MIH spectral data. Trend data shows an increase in overall amplitude in G's. Waveform also shows high g's with pk-pk amplitude of 16 g's.

Recommendation:

Motor data suggests bearing defects in the motor. Pump may also have some internal wear. Inspect/replace soon.

Abbreviated Last Measurement Summary

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Database: AECI Dell Power Plant.rbm
Area: Cooling Tower

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD
CTW1 - Cooling Tower Fan 1	(08-Nov-23)	
	OVERALL LEVEL	1K-20kHz
MOH	.210 In/Sec	1.232 G-s
MOP	.452 G-s	
MOV	.259 In/Sec	.653 G-s
MIH	.213 In/Sec	1.287 G-s
MIP	.695 G-s	
MIV	.219 In/Sec	1.164 G-s
MIA	.216 In/Sec	.605 G-s
CTW2 - Cooling Tower Fan 2	(08-Nov-23)	
	OVERALL LEVEL	1K-20kHz
MOH	.228 In/Sec	1.689 G-s
MOP	.651 G-s	
MOV	.144 In/Sec	1.262 G-s
MIH	.167 In/Sec	2.502 G-s
MIP	1.732 G-s	
MIV	.183 In/Sec	2.582 G-s
MIA	.292 In/Sec	1.935 G-s
CTW3 - Cooling Tower Fan 3	(08-Nov-23)	
	OVERALL LEVEL	1K-20kHz
MOH	.339 In/Sec	1.159 G-s
MOP	.460 G-s	
MOV	.382 In/Sec	.735 G-s
MIH	.345 In/Sec	.611 G-s
MIP	.177 G-s	
MIV	.380 In/Sec	.778 G-s
MIA	.473 In/Sec	.716 G-s
CTW4 - Cooling Tower Fan 4	(08-Nov-23)	
	OVERALL LEVEL	1K-20kHz
MOH	.189 In/Sec	.858 G-s
MOP	.189 G-s	
MOV	.245 In/Sec	1.038 G-s
MIH	.216 In/Sec	.759 G-s
MIP	.225 G-s	
MIV	.242 In/Sec	.720 G-s
MIA	.272 In/Sec	.397 G-s
CTW5 - Cooling Tower Fan 5	(08-Nov-23)	
	OVERALL LEVEL	1K-20kHz
MOH	.291 In/Sec	.759 G-s
MOP	.305 G-s	
MOV	.187 In/Sec	.867 G-s
MIH	.289 In/Sec	1.809 G-s
MIP	.250 G-s	
MIV	.163 In/Sec	1.157 G-s
MIA	.297 In/Sec	.552 G-s
CTW6 - Cooling Tower Fan 6	(08-Nov-23)	
	OVERALL LEVEL	1K-20kHz
MOH	.239 In/Sec	1.238 G-s
MOP	.356 G-s	
MOV	.267 In/Sec	.821 G-s
MIH	.285 In/Sec	.958 G-s
MIP	.148 G-s	
MIV	.267 In/Sec	1.326 G-s
MIA	.366 In/Sec	.743 G-s

CTW7 - Cooling Tower Fan 7 (08-Nov-23)

	OVERALL LEVEL	1K-20kHz
MOH	.138 In/Sec	.981 G-s
MOP	.531 G-s	
MOV	.352 In/Sec	1.050 G-s
MIH	.139 In/Sec	1.072 G-s
MIP	.788 G-s	
MIV	.322 In/Sec	1.293 G-s
MIA	.322 In/Sec	.860 G-s

CTW8 - Cooling Tower Fan 8 (08-Nov-23)

	OVERALL LEVEL	1K-20kHz
MOH	.305 In/Sec	1.536 G-s
MOP	.212 G-s	
MOV	.292 In/Sec	1.197 G-s
MIH	.249 In/Sec	1.323 G-s
MIP	.226 G-s	
MIV	.236 In/Sec	.784 G-s
MIA	.323 In/Sec	.367 G-s

CTW9 - Cooling Tower Fan 9 (08-Nov-23)

	OVERALL LEVEL	1K-20kHz
MOH	.336 In/Sec	2.201 G-s
MOP	.387 G-s	
MOV	.326 In/Sec	1.649 G-s
MIH	.158 In/Sec	1.701 G-s
MIP	.445 G-s	
MIV	.290 In/Sec	1.105 G-s
MIA	.388 In/Sec	.770 G-s

CTW10 - Cooling Tower Fan 10 (08-Nov-23)

	OVERALL LEVEL	1K-20kHz
MOH	.256 In/Sec	1.366 G-s
MOP	.486 G-s	
MOV	.420 In/Sec	.848 G-s
MIH	.261 In/Sec	1.810 G-s
MIP	.785 G-s	
MIV	.333 In/Sec	1.172 G-s
MIA	.286 In/Sec	1.819 G-s

CTW11 - Cooling Tower Fan 11 (08-Nov-23)

	OVERALL LEVEL	1K-20kHz
MOH	.168 In/Sec	.988 G-s
MOP	.290 G-s	
MOV	.188 In/Sec	.939 G-s
MIH	.158 In/Sec	1.071 G-s
MIP	.447 G-s	
MIV	.164 In/Sec	1.025 G-s
MIA	.172 In/Sec	.592 G-s

CTW12 - Cooling Tower Fan 12 (08-Nov-23)

	OVERALL LEVEL	1K-20kHz
MOH	.219 In/Sec	.739 G-s
MOP	.351 G-s	
MOV	.295 In/Sec	1.883 G-s
MIH	.183 In/Sec	1.567 G-s
MIP	.731 G-s	
MIV	.231 In/Sec	1.489 G-s
MIA	.252 In/Sec	.907 G-s

3CW-P-002 - Circ Water Pump 1B (08-Nov-23)

	OVERALL LEVEL	1K-20kHz
MOH	.192 In/Sec	.271 G-s
MOP	.119 G-s	
MOV	.338 In/Sec	.191 G-s
MIH	.094 In/Sec	.162 G-s
MIP	.050 G-s	
MIV	.210 In/Sec	.130 G-s
MIA	.112 In/Sec	.181 G-s

LFAA1	- LFAA 1A		(08-Nov-23)
		OVERALL LEVEL	1K-20kHz
	MOH	.543 In/Sec	.410 G-s
	MOP	.202 G-s	
	MOV	.811 In/Sec	.458 G-s
	MIH	.335 In/Sec	.764 G-s
	MIP	.396 G-s	
	MIV	.451 In/Sec	.492 G-s
	MIA	.071 In/Sec	.454 G-s
		OVERALL LEVEL	1K-20KHz
	PIH	.036 In/Sec	.146 G-s
	PIP	.0031 G-s	
	PIV	.036 In/Sec	.117 G-s
	PIA	.014 In/Sec	.195 G-s

Area: UNIT 1

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD

LP #1	- LP recirc unit #1		(08-Nov-23)
		OVERALL LEVEL	1K-20kHz
	MOH	.078 In/Sec	.140 G-s
	MOP	.041 G-s	
	MOV	.076 In/Sec	.257 G-s
	MIH	.098 In/Sec	.647 G-s
	MIP	.368 G-s	
	MIV	.132 In/Sec	.704 G-s
	MIA	.196 In/Sec	.248 G-s
		OVERALL LEVEL	1K-20KHz
	PIH	.422 In/Sec	.194 G-s
	PIP	.072 G-s	
	PIV	.116 In/Sec	.187 G-s
	POH	.190 In/Sec	.226 G-s
	POP	.055 G-s	
	POV	.142 In/Sec	.190 G-s
	POA	.131 In/Sec	.265 G-s

1FD-P-001B	- Boiler Feed Water 1B		(08-Nov-23)
		OVERALL LEVEL	1K-20KHz
	MOH	.108 In/Sec	.188 G-s
	MOP	.043 G-s	
	MOV	.139 In/Sec	.131 G-s
	MIH	.151 In/Sec	.137 G-s
	MIP	.014 G-s	
	MIV	.169 In/Sec	.217 G-s
	MIA	.116 In/Sec	.222 G-s
		OVERALL LEVEL	1K-20kHz
	NIA	.084 In/Sec	.168 G-s
	NIH	.046 In/Sec	.123 G-s
	NIV	.050 In/Sec	.153 G-s
	NOV	.046 In/Sec	.086 G-s
	NOH	.054 In/Sec	.079 G-s
	NOA	.079 In/Sec	.127 G-s
		OVERALL LEVEL	1K-20KHz
	BFA	.029 In/Sec	.234 G-s
	PIH	.049 In/Sec	.236 G-s
	PIV	.063 In/Sec	.173 G-s
	POV	.056 In/Sec	.060 G-s
	POH	.084 In/Sec	.058 G-s

CT2	- CT Lube Oil Pump 2		(08-Nov-23)
		OVERALL LEVEL	1K-20kHz
	MOH	.076 In/Sec	.140 G-s
	MOP	.049 G-s	
	MOV	.059 In/Sec	.162 G-s
	MIH	.054 In/Sec	.259 G-s
	MIP	.090 G-s	
	MIV	.050 In/Sec	.058 G-s
	MIA	.056 In/Sec	.145 G-s

CTHYD !1 - CT Hyd Pump 2 (08-Nov-23)

	OVERALL LEVEL	1K-20kHz
MOH	.319 In/Sec	.144 G-s
MOP	.036 G-s	
MOV	.102 In/Sec	.089 G-s
MIH	.031 In/Sec	.349 G-s
MIP	.159 G-s	
MIV	.069 In/Sec	.276 G-s
MIA	.106 In/Sec	.504 G-s

Area: UNIT 2

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD

LP #2 - LP recirc unit #2 (08-Nov-23)

	OVERALL LEVEL	1K-20kHz
MOH	.106 In/Sec	.465 G-s
MOP	.237 G-s	
MOV	.060 In/Sec	.574 G-s
MIH	.144 In/Sec	.849 G-s
MIP	.359 G-s	
MIV	.084 In/Sec	.708 G-s
MIA	.137 In/Sec	.406 G-s
	OVERALL LEVEL	1K-20KHz
PIH	.120 In/Sec	.210 G-s
PIP	.078 G-s	
PIV	.082 In/Sec	.178 G-s
POH	.110 In/Sec	.332 G-s
POP	.285 G-s	
POV	.096 In/Sec	.358 G-s
POA	.079 In/Sec	.162 G-s

2FD-P-002B - Boiler Feed Water 2B (08-Nov-23)

	OVERALL LEVEL	1K-20KHz
MOH	.023 In/Sec	.095 G-s
MOP	.063 G-s	
MOV	.060 In/Sec	.142 G-s
MIH	.042 In/Sec	.110 G-s
MIP	.048 G-s	
MIV	.035 In/Sec	.063 G-s
MIA	.057 In/Sec	.056 G-s
	OVERALL LEVEL	1K-20kHz
NIA	.111 In/Sec	.635 G-s
NIH	.037 In/Sec	.244 G-s
NIV	.025 In/Sec	.238 G-s
NOV	.018 In/Sec	.080 G-s
NOH	.057 In/Sec	.110 G-s
NOA	.101 In/Sec	.415 G-s
	OVERALL LEVEL	1K-20KHz
BFA	.027 In/Sec	.145 G-s
PIH	.052 In/Sec	.201 G-s
PIV	.041 In/Sec	.102 G-s
POV	.052 In/Sec	.075 G-s
POH	.097 In/Sec	.074 G-s

CT1 - CT Lube Oil Pump 1 (08-Nov-23)

	OVERALL LEVEL	1K-20kHz
MOH	.066 In/Sec	.297 G-s
MOP	.153 G-s	
MOV	.045 In/Sec	.121 G-s
MIH	.062 In/Sec	.059 G-s
MIP	.012 G-s	
MIV	.041 In/Sec	.176 G-s
MIA	.067 In/Sec	.089 G-s

CTHYD ! - CT Hyd Pump 1 (08-Nov-23)

	OVERALL LEVEL	1K-20kHz
MOH	.089 In/Sec	.200 G-s

MOP	.068 G-s		
MOV	.047 In/Sec	.266 G-s	
MIH	.030 In/Sec	.349 G-s	
MIP	.142 G-s		
MIV	.027 In/Sec	.679 G-s	
MIA	.046 In/Sec	.700 G-s	

ABF - Aux Boiler Fan (08-Nov-23)

	OVERALL LEVEL	1K-20kHz
MOH	.109 In/Sec	.189 G-s
MOP	.057 G-s	
MOV	.289 In/Sec	.314 G-s
MIH	.059 In/Sec	.255 G-s
MIP	.104 G-s	
MIV	.063 In/Sec	.414 G-s
MIA	.243 In/Sec	.244 G-s

Area: UNIT STEAM TURBINE

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD

3CW-P-003 - CCW Booster Pump 1 (08-Nov-23)

	OVERALL LEVEL	1K-20kHz
MOH	.086 In/Sec	.502 G-s
MOP	.316 G-s	
MOV	.079 In/Sec	.421 G-s
MIH	.039 In/Sec	.657 G-s
MIP	.339 G-s	
MIV	.052 In/Sec	.496 G-s
MIA	.099 In/Sec	.379 G-s
	OVERALL LEVEL	1K-20KHz
PIH	.113 In/Sec	.290 G-s
PIP	.185 G-s	
PIV	.072 In/Sec	.436 G-s

0CC-P-002 - Closed Cooling Water 2 (08-Nov-23)

	OVERALL LEVEL	1K-20kHz
MOH	.058 In/Sec	.569 G-s
MOP	.250 G-s	
MOV	.037 In/Sec	.831 G-s
MIH	.070 In/Sec	.397 G-s
MIP	.193 G-s	
MIV	.037 In/Sec	.591 G-s
MIA	.044 In/Sec	.519 G-s
	OVERALL LEVEL	1K-20KHz
PIH	.054 In/Sec	.715 G-s
PIP	.520 G-s	
PIV	.074 In/Sec	.559 G-s
POH	.083 In/Sec	.544 G-s
POP	.344 G-s	
POV	.097 In/Sec	.601 G-s
POA	.089 In/Sec	.615 G-s

3CH-P-001C - Condensate PumpC (08-Nov-23)

	OVERALL LEVEL	1K-20kHz
MOH	.256 In/Sec	.179 G-s
MOP	.074 G-s	
MOV	.333 In/Sec	.229 G-s
MIH	.137 In/Sec	.418 G-s
MIP	.152 G-s	
MIV	.137 In/Sec	.461 G-s
MIA	.070 In/Sec	.626 G-s
	OVERALL LEVEL	1K-20KHz
PIH	.121 In/Sec	1.483 G-s
PIP	.672 G-s	
PIV	.143 In/Sec	.614 G-s
PIA	.034 In/Sec	.446 G-s

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3AE-P-002  - Vacuum Pump 2                (08-Nov-23)
                              OVERALL LEVEL     1K-20kHz
        MOH                    .115 In/Sec       .709 G-s
        MOP                    .163 G-s
        MOV                    .130 In/Sec       .812 G-s
        MIH                    .148 In/Sec       .224 G-s
        MIP                    .149 G-s
        MIV                    .196 In/Sec       .933 G-s
        MIA                    .172 In/Sec       .184 G-s
                              OVERALL LEVEL     1K-20KHz
        PIH                    .197 In/Sec      1.060 G-s
        PIP                    .558 G-s
        PIV                    .371 In/Sec       .673 G-s
        POH                    .257 In/Sec       .491 G-s
        POP                    .315 G-s
        POV                    .439 In/Sec       .740 G-s
        POA                    .164 In/Sec       .642 G-s

STG2       - STG Lube Oil Pump 2          (08-Nov-23)
                              OVERALL LEVEL     1K-20kHz
        MOH                    .045 In/Sec       .228 G-s
        MOP                    .077 G-s
        MOV                    .060 In/Sec       .437 G-s
        MIH                    .033 In/Sec       .491 G-s
        MIP                    .213 G-s
        MIV                    .035 In/Sec       .370 G-s
        MIA                    .049 In/Sec       .420 G-s

STGHyd1    - STG Hyd Pump 1               (08-Nov-23)
                              OVERALL LEVEL     1K-20kHz
        MOH                    .280 In/Sec      1.263 G-s
        MOP                    .639 G-s
        MOV                    .179 In/Sec      1.967 G-s
        MIH                    .271 In/Sec      3.127 G-s
        MIP                   1.532 G-s
        MIV                    .189 In/Sec      3.069 G-s
        MIA                    .170 In/Sec      2.389 G-s
                              OVERALL LEVEL     1K-20KHz
        PIH                    .222 In/Sec      1.246 G-s
        PIP                    .607 G-s
        PIV                    .317 In/Sec      1.795 G-s
        PIA                    .286 In/Sec      1.741 G-s

-------------------------------------------------------------------------------
   Clarification Of Vibration Units:
      Acc       -->  G-s      RMS
      Vel       -->  In/Sec   PK
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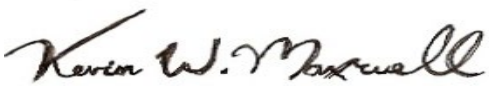
As always, it has been a pleasure to serve AECI Dell Power Plant. If there are any comments or questions, do not hesitate to contact us.

Sincerely,



HI-SPEED INDUSTRIAL SERVICE

Category III Vibration Analyst

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